

Application No. 09/815,816
Amendment Date April 13, 2004
Reply to Office action of March 16, 2004

Amendments to the Claims

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A method for detecting the mark in an image comprising:

- a. obtaining an image of at least one mark;
- b. locating the center of each mark based on symmetry;
- c. processing the mark image using at least one directional elongated filter;
- d. rejecting artifacts based on symmetry.

Claim 2 (currently amended): The method of claim 1 further comprising a step of classifying mark type comprising a feature extraction step and a classification step.

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Claim 3 (canceled).

Claim 4 (original): The method of claim 1 wherein at least one parameter of the directional elongated filter is determined by learning.

Claim 5 (canceled).

Claim 6 (currently amended): A method for detecting the mark in an image comprising:

- a. obtaining an image of at least one mark;
- b. locating the center of each mark based on symmetry;
- c. processing the mark image using at least one directional elongated filter;
- d. rejecting artifacts based on symmetry;

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e. classifying mark type The method of claim 2 wherein features for classification of mark type are selected from a group consisting of curvature of an arc, intersection angle of lines, relative position of lines, relative angle between lines, direction of symmetry axes, parallelism, projection of detected marks to the symmetry axes, and orthogonality of lines.

Claim 7 (original): A method of locating a detected mark's position in an image comprising:

- a. creating a gray scale image of at least one mark;
- b. masking portions of the image based upon detected mark elements;
- c. estimating mark position using a structure guided estimation process.

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Claim 8 (currently amended): The method of claim 7 wherein detected mark elements determine the structure constraints applied to the structure guided estimation process.

Claims 9-10 (canceled).

Claim 11 (currently amended): The method of claim 7 further comprises wherein the structure guided estimation process uses a weight image to emphasize particularly important or definitive portions of the mark.

Claim 12 (original): The method of claim 11 wherein the weight image is learned.

Claim 13 (currently amended): A method of locating a detected mark's position in an image comprising:

- a. creating a gray scale image of at least one mark;
- b. masking portions of the image based upon detected mark elements;
- c. estimating mark position using a structure guided estimation process
wherein detected mark elements determine the constraints applied to the

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structure guided estimation process ~~The method of claim 8~~ wherein the constraints are selected from a group consisting of parallel lines, perpendicular lines, rings, circles, arcs, line length, intersection angle of lines, and line width.

Claims 14-18 (canceled).

Claim 19 (currently amended): A method of measuring orientation of a mark in an image comprising:

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- a. obtaining an image of at least one mark;
- b. locating the center of the each mark along each axis of symmetry;
- c. measuring the mark orientation using a structure-guided estimation process ~~wherein detected mark determines the constraints applied to the structure guided estimation process~~ ~~The method of claim 15~~ wherein the constraints are selected from a group consisting of parallel lines, perpendicular lines, rings, circles, arcs, line length, intersection angle of lines, and line width.

Claim 20 (canceled)

Claim 21 (original). A method of learning specific mark structure comprising;

- a. obtaining an image of at least one mark;
- b. filtering the image using at least one directional elongated filter;
- c. determining at least one parameter of the mark through a learning process.